

# Important Advances in Clinical Medicine

## *Epitomes of Progress — Neurosurgery*

*The Scientific Board of the California Medical Association presents the following inventory of items of progress in neurosurgery. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in neurosurgery which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.*

*The items of progress listed below were selected by the Advisory Panel to the Section on Neurosurgery of the California Medical Association and the summaries were prepared under its direction.*

Reprint requests to: Division of Scientific and Educational Activities,  
California Medical Association, 731 Market St., San Francisco, CA 94103

### **Microsurgical Treatment of Ischemic Cerebrovascular Disease**

THE APPLICATION of microsurgical techniques to the problem of cerebral ischemia can improve collateral circulation to the brain. It is now possible to create new pathways of blood flow by surgical anastomosis of arteries that normally supply the scalp to intracranial cerebral vessels. The most common procedure produces an end-to-side anastomosis between the superficial temporal artery and a branch of the middle cerebral artery (STA-MCA). Internal diameters of the vessels involved range from 0.8 mm to 1.5 mm, necessitating the use of an operating microscope and 10-0 monofilamentous suture. More than 2,500 of these bypass operations have been done, and a recent review of published cases shows a patency rate greater than 90 percent with surgical morbidity and mortality both below 5 percent.

STA-MCA bypass is most applicable to patients with arterial obstructions or stenosis out of the reach of more classical cervical carotid artery reconstructive techniques. Indications for the operation include transient ischemic attacks (TIA) and reversible ischemic neurological deficits (RIND) occurring in patients with carotid artery occlusion,

middle cerebral artery or carotid siphon stenosis or occlusion. Follow-up studies show a pronounced enlargement of the anastomosis demonstrable on cerebral angiography with the superficial temporal artery supplying blood to most of the middle cerebral artery distribution. Regional cerebral blood flow data indicate a 20 percent increase in flow to the previously ischemic region. Clinically, a significant reduction or complete cessation of TIA's occurs in patients, and in some instances there is a reversal of ischemic neurological deficits.

In the fall of 1977 an international, multicenter, randomized study was begun to compare the long-term results of such bypass operations with platelet suppression therapy. It is hoped that this study will answer questions regarding the relationship between surgically enhanced collateral cerebral flow and death due to stroke.

In the meantime, further developments in microvascular techniques continue to emerge. Revascularization of the vertebral-basilar system is now a reality utilizing the occipital artery as a donor and establishing an anastomosis to the posterior inferior cerebellar artery. In those instances where suitable donor arteries are lacking, autogenous vein and arterial grafts are being employed as well as an occasional synthetic tube graft. With

the magnification and improved illumination afforded by operating microscopes, middle cerebral artery embolectomy has experienced a resurgence. However, results seem to indicate that perhaps the STA-MCA bypass may be a more acceptable method of treatment in these cases.

STEVEN GIANNOTTA, MD

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## Occult Spinal Dysraphism: Early and Accurate Diagnosis

OCCULT SPINAL DYSRAPHISM is a spectrum of congenital malformations that encompasses congenital dermal sinus, the tethered cord syndrome, lumbosacral lipoma and lipomyelomeningocele, diastematomyelia and other less frequent entities. Hallmarks of the condition are the low position of the conus medullaris below the second lumbar vertebra due to tethering by embryologically misplaced tissues and a posterior spina bifida. Traction on the tethered cord and occasionally compression by the abnormal tissue can produce one or more features of the neuromusculoskeletal syndrome or orthopedic syndrome, as termed by James and Lassman. A unilateral pes cavus, underdeveloped foot, shorter leg with muscle weakness and atrophy, insensitive skin, as well as urinary incontinence and scoliosis may be present at birth but more commonly evolve after a period of relatively normal development. A cutaneous anomaly such as hypertrichosis, hemangiomatous discoloration, a dimple or sinus or a subcutaneous lipoma may overlie the region of the spina bifida and intraspinal pathologic condition. The general consensus is that occult spinal dysraphism is progressive once it becomes symptomatic, but stabilizes or improves following operative relief of traction and compression and that early treatment is desirable in many cases.

The diagnosis of this condition is often missed by Pantopaque myelography which usually requires a general anesthetic for children younger than seven years. However, metrizamide myelography combined with spinal computed tomography enables the diagnosis to be made easier, earlier and more accurately. Metrizamide is a water-soluble agent with a low incidence of side effects and is completely absorbed from the dural sac; and the entire

procedure is carried out under local anesthetic and sedation in all age groups. The level of the conus medullaris, the thickness of the filum terminale, the direction of caudal nerve roots as well as abnormal bands and adhesions or intraspinal filling defects are clearly displayed. Computed tomography of the metrizamide-filled dural sac details the relationships of the intraspinal structures and can identify abnormal tissues such as lipoma or cartilage on the basis of density measurements. The combined procedures yield far more information than either one done individually. Consequently, studies can be done in mildly symptomatic or even asymptomatic children with every expectation of arriving at a reliable diagnosis and treatment can be rendered before irreversible deficits develop.

BARRY N. FRENCH, MD, FRCS(C)

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## Postconcussion Syndrome

CEREBRAL CONCUSSION is a retrospective diagnosis that relates to a *transient* loss of neurologic function from which there is rapid and complete recovery without neurologic residua. It is frequently associated with a period of amnesia which relates to events immediately preceding and following the concussive event; the length of these periods of *retrograde* and *anterograde* amnesia may provide an index of the extent of the concussion. The diagnosis is established on the basis of the clinical history (transient loss of neurologic function which may or may not include unconsciousness) and absence of pathologic, chemical or radiographic findings that will either establish or invalidate the diagnosis. The presence of a concussion in itself is not a necessary harbinger of a more serious consequence in a patient's subsequent clinical course. The diagnosis of concussion simply represents clinical documentation that the extent of cerebral trauma was sufficient to transiently interrupt or disturb cerebral function.

A small but significant percentage of patients who experience a cerebral concussion as defined above will subsequently complain of recurrent headaches, dizziness, vertigo, anxiety and generalized fatigue. These symptoms, or any combination of them, have been termed the postconcussion syndrome. The process may prove to be